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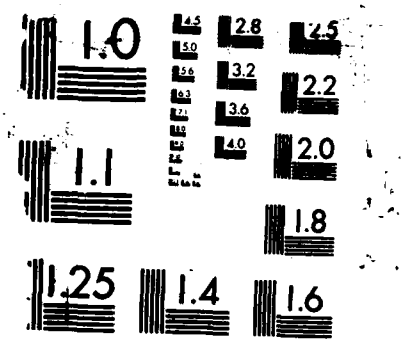

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TENTH ANNUAL ARMY TOPO CONFERENCE, OCTOBER 1987

A DIGITAL TERRAIN DATA (DTD) PRODUCTION INITIATIVE

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With the ever increasing need for digital terrain data (DTD) by developers and commanders in support of emerging weapons systems, weapons support systems, training, simulators, and tactical operations, the requirement to produce these data is becoming more critical each day. Several initiatives have been undertaken by the Army to identify DTD requirements in terms of data content, format, accuracies, data resolution, etc. Although these data are, in many instances, available in hard-copy overlay format, very little data are available to support these systems in a digital format except for several prototypes of small areas produced by DMA. The Terrain Analysis Center (TAC), as a result of executing its modernization initiative, also has a requirement for DTD to produce future products and services; consequently, TAC plans to begin digitizing available Tactical Terrain Analysis Data Base (TTADB) hardcopy products to satisfy this requirement. It is the purpose of this paper to briefly review Army DTD requirements, current production efforts, shortfalls in meeting future requirements, and discuss the TAC DTD production initiative.

The U.S. Army Engineer Topographic Laboratories' (USAETL's) Concepts Analysis Division conducted an investigation this past summer which documented known and anticipated DTD requirements of the Army prior to 1993. This is the date DMA has programmed to have the capability to produce DTD in volume. Fourteen systems were identified to have mid-term DTD requirements, to include FIREFINDER, ASAS/DTSS, JSTARS, FOG-M, and others. The study concluded "that the DMA DTED/DFAD data bases currently in production were inadequate, inappropriate, or unavailable for many applications." Fielding of Tactical Terrain Data (TTD),

a concept developed to support these emerging system requirements, is not intended to come on line until the mid-1990s. Consequently, the fourteen systems mentioned and other tactical operational requirements for DTD will go unsatisfied until some solution or program is initiated.

DMA, in order to provide an interim solution to this problem, is developing a prototype Interim Terrain Data (ITD) to be made available in November 1987. However, it does not appear these data will be available in sufficient volume to support these time critical requirements. Under the DMA Mark 90 concept for the production of TTD, it still remains unclear as to what data exchange format DMA will employ. The TTD prototype may be produced in either of two formats, the Federal Geographic Exchange Format or ISO-8211. This issue will have bearing on any interim TAC production initiative undertaken to insure compatibility.

Because of the need to modernize TAC's production processes, the Center will have a need for DTD to generate requested products and services. Therefore, the availability of DTD is critical. Consequently, the Center will begin production of DTD by digitizing existing TTADB overlays in-house and under contract late in this fiscal year. TAC will generate a generic terrain data file capable of supporting in-house requirements, but this file also will be made available to the user community. Currently, TAC envisions use of the ARC/INFO system to generate its automated water resources data base and will investigate employing this system for digitizing terrain data. The ARC/INFO system, developed by ESRI and Henco, respectively, is a geographic information system designed for managing cartographic and spatially associated tabular data. It is designed to serve as a generic tool box of data entry, manipulation, analysis and display procedures. It organizes geographic data using a relational and topological model. This facilitates efficient handling of the two generic classes of spatial data: cartographic data describing the location and topology of point, line and polygon features; and attribute data describing characteristics of these features. Assuming that DMA has not specified a data exchange format for TTD by the end of this year, TAC will probably start production using ARC/INFO which later can be transformed to a usable format for other users.

TAC's interim initiative is not intended to provide volumes of DTD for the fourteen systems requiring terrain data. But if ARC/INFO proves to be an efficient and effective mechanism for storing digitized data, TAC will have the capability to produce digitized TTADB sheets at a rate of approximately 50 sheets per year. This output could be increased with additional in-house resources and contractor support. These data could also be transformed and integrated into the TTD when DMA has an operational production capability.

TAC's ultimate goal, through its modernization initiative, is to produce digital terrain and water resources data, maintain these data in generic files, transform DMA and TAC produced data into required formats to support emerging Army systems and operational requirements, and serve as the central distribution point for transformed data. Digitization is TAC's first step in meeting the Army's need for DTD.

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